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ABSTRACT

This booklet is one of six texts from a workplace literacy curriculum designed to assist learners in facing the increased demands of the workplace. Six problem-solving techniques are developed in the booklet to assist individuals and groups in making better decisions: problem identification, data gathering, data analysis, solution analysis, solution implementation, and problem prevention. The first part of the booklet concentrates on applying these steps to an individual problem, and the second section talks about problem solving in a group. Examples from a simple job-related problem are used. A discussion of brainstorming and a description of methods for organizing and recording data conclude the booklet. (KC)

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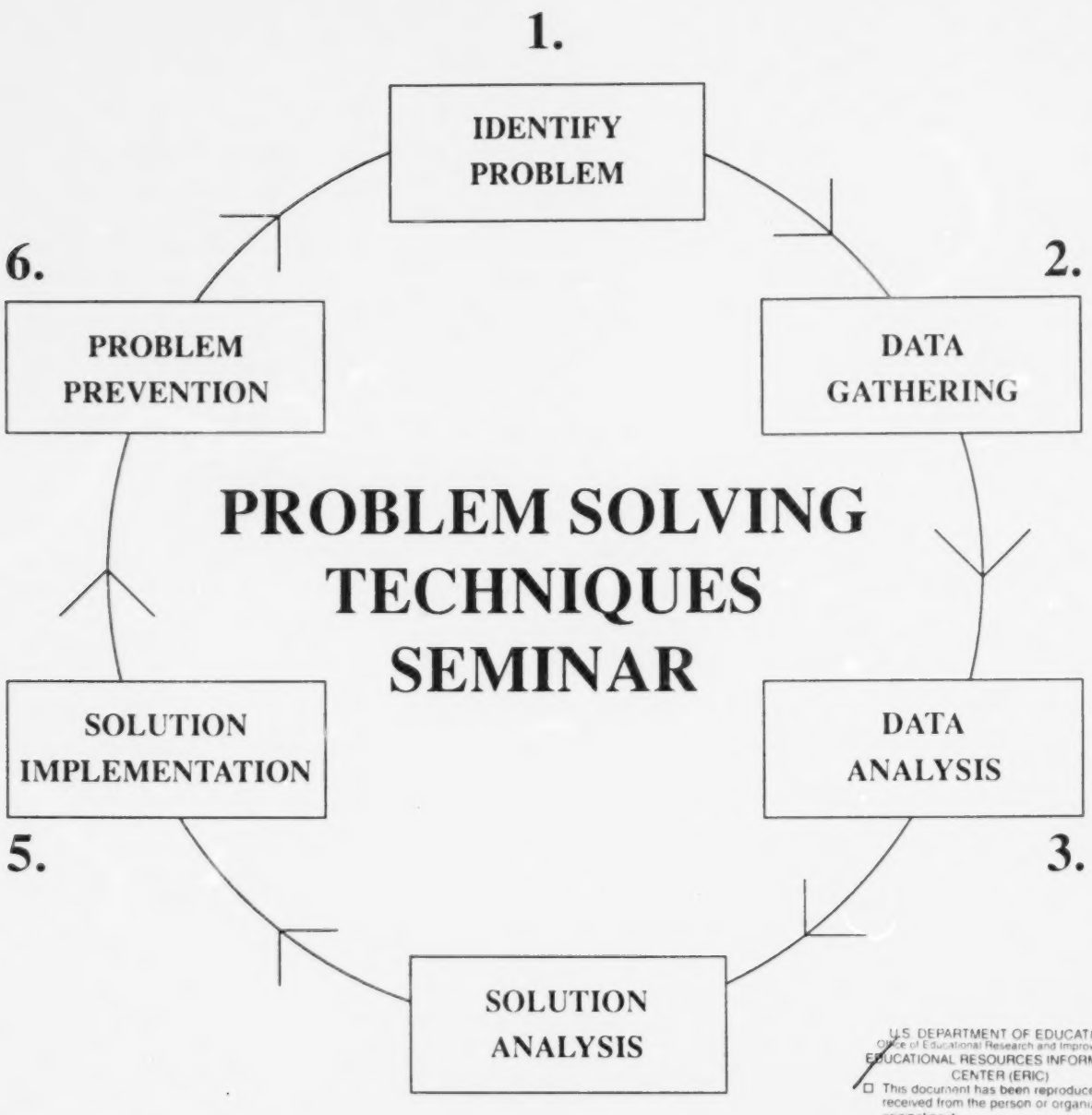

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This book is one in a series of six curriculum texts used specifically to assist students in facing the increased demands of the modern work world. With the advanced of technology, workers are expected to know and do more. For this reason, MCDI has written and implemented a curriculum to include the following skills:

Motivation and Self Esteem
Problem Solving Techniques
Quality Assurance Control/Application
Team Building
Total Quality Management Concepts and Application
Safety

The objective of this innovative methodology is to develop a more holistic approach to employment training, one that integrates quality assurance, excellence in work production, and wise decision making along with occupational skills training. The focus of this particular booklet is Problem Solving Techniques.

Individuals solve problems and make decisions many times daily in their professional and personal lives. The task is done either alone, in relationship with another person, as a member of a family, or within a group of co-workers.

Problems vary in size and difficulty. Some are more easily solved without much thought or consideration. Others require greater concentration and skill. For example, deciding the fastest and shortest route to work takes more strategy and energy than determining when to set the alarm to get to work on time.

A problem is a doubtful, uncertain, difficult, or conflicting situation that requires an answer, solution, or decision. Problem solving or decision making is the act of deciding the BEST choice or solution out of many possible choices.

Because our personal and work lives involve making decisions and solving problems, it is helpful to learn and put into practice the skills and techniques that make the process easier.

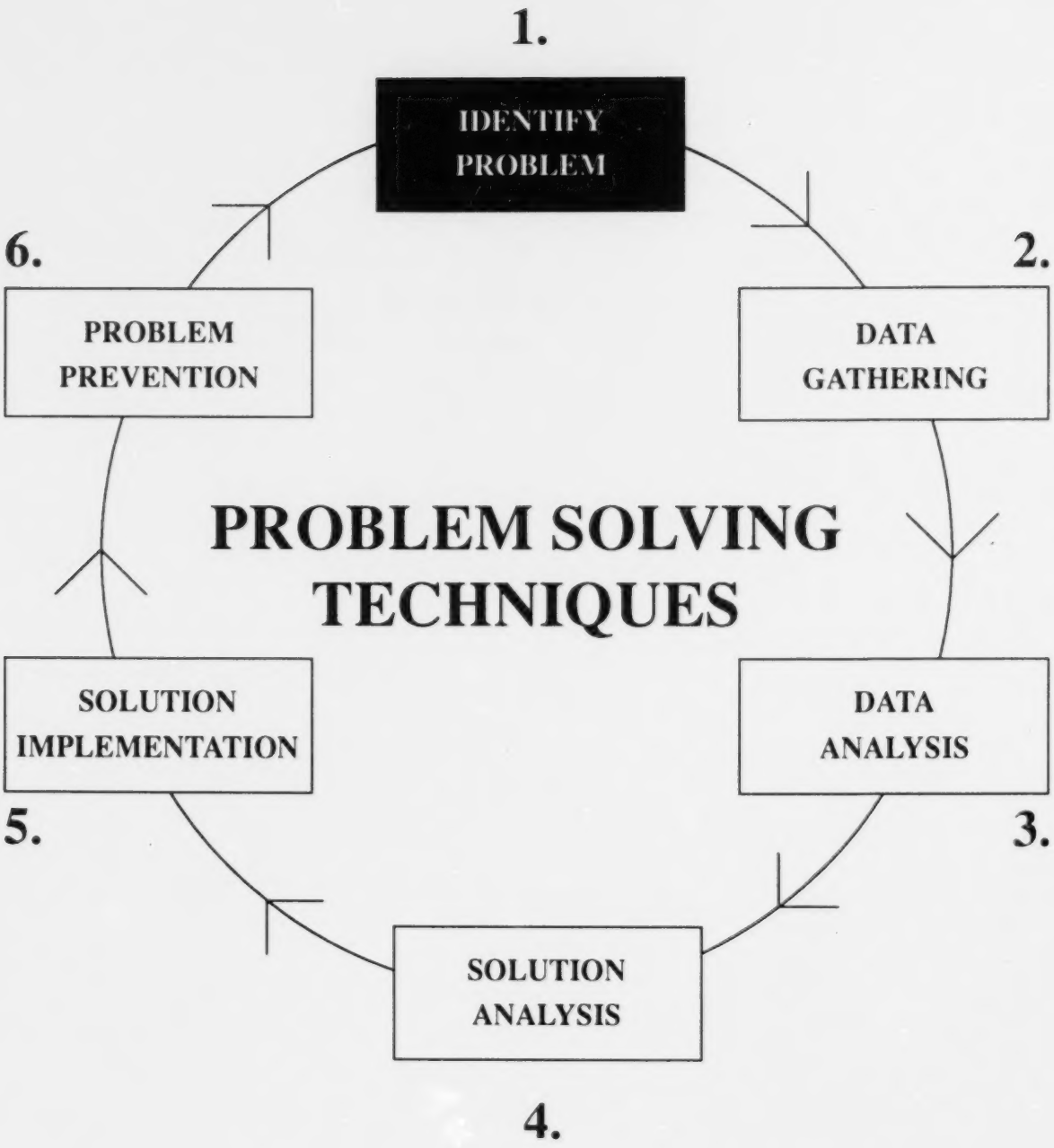
There are six problem-solving techniques developed in this booklet to assist individuals and groups to make better decisions. The first part of the booklet concentrates on applying these steps to an individual problem and the last section talks about problem solving in a group.

Although problem solving skills can be applied to all areas of life, the example used in these pages refers to a simple job-related problem. The same procedure is used for more complex problems.

The role of the instructor is to help students apply the six techniques in order to arrive at a solution. The instructor is basically a facilitator.

Problem solving includes a skill called brainstorming. Brainstorming is a method that generates ideas naturally and spontaneously without judgement or criticism. This skill is especially helpful in a group where ideas are developed and discussed. A chapter on brainstorming concludes this booklet.

Problem solving is an art and like any art, it becomes better with practice. No one makes perfect decisions every time but developing problem solving skills helps increase one's decision-making ability and avoids mistakes that are costly in time and production. Good problem solving techniques promote quality work. The ability to make wise decisions increases a person's self confidence and ensures greater employment success.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6.
PROBLEM PREVENTION
PROBLEM SOLVING TECHNIQUES

STEP 1 - PROBLEM IDENTIFICATION

A problem can't be solved if it is not known. Consequently, the first step in problem solving is to ACCURATELY identify the problem. Naming the problem takes careful thought, patience, and honesty.

Sometimes a person is too close to the problem to see it clearly. The person may have to step back in order to view it in a detailed, honest manner. It is so easy to make vague statements. To avoid confusion:

ASK WHAT THE PROBLEM IS

AND WHAT IT IS NOT.

Here are some examples of vague statements and how they can be improved.

VAGUE STATEMENTS	DETAILED STATEMENTS
The television is broken.	The TV has no picture
Turn the switch.	Turn the On Switch to the right.
Absenteeism is a business problem.	In the last month, there were 10 people absent 3 or more days without explanation.
There is little money available now.	I have poor spending habits.

I can't tape the basketball game.	My VCR won't record.
I'm late for work a lot.	I am 5-10 minutes late every Friday.
My son can't go to college this year.	My son lost the summer job that paid for his tuition .
Mary failed her math exam.	Mary failed her math exam because she didn't know her multiplication tables.

To demonstrate the confusion that results when vague statements are made, your instructor will give you oral instructions on how to complete the exercise entitled, Young Woman at the Beach.

A common mistake many people make is to think the symptom of the problem is the problem. The symptom is a sign or indication but may not necessarily be the actual problem itself. For example, smoke is a symbol of fire. The smoke is not the problem, the fire is. Without the fire, there would be no smoke. At Peter's place of employment, he missed many monthly sales production meeting. His absence is a symptom that something is wrong. The actual problem is that he failed to record the date in his calendar.

Once the problem is identified, you need to determine if the problem will solve itself in time or if action needs to be taken. Sometimes the best decision is to do nothing. But if the problem requires action, do it immediately.

PROBLEM SITUATION

John has a job working in the shipping department at a large manufacturing company that produces chemicals. His responsibility is to ship products to customers at definite times. John is usually competent in his work but has recently gotten into difficulty with his supervisor. The difficulty arises when John fails to ship products on time. Many customers complained because they didn't receive chemicals as specified in their contracts. Some customers brought their business elsewhere. The supervisor finally told John that if he didn't do something about this situation, he would lose his job.

IDENTIFYING THE PROBLEM

To correct the situation, John has to identify the problem. He could get angry and blame the supervisor for picking on him. The supervisor, however, made it clear that it was John's problem. He wasn't shipping materials on time.

John looked into the situation and noticed that delays in shipping chemicals occurred on Friday. Friday was a bad day for John even before he got to work. In fact he was usually an hour late Friday because he had to drop his son at nursery school.

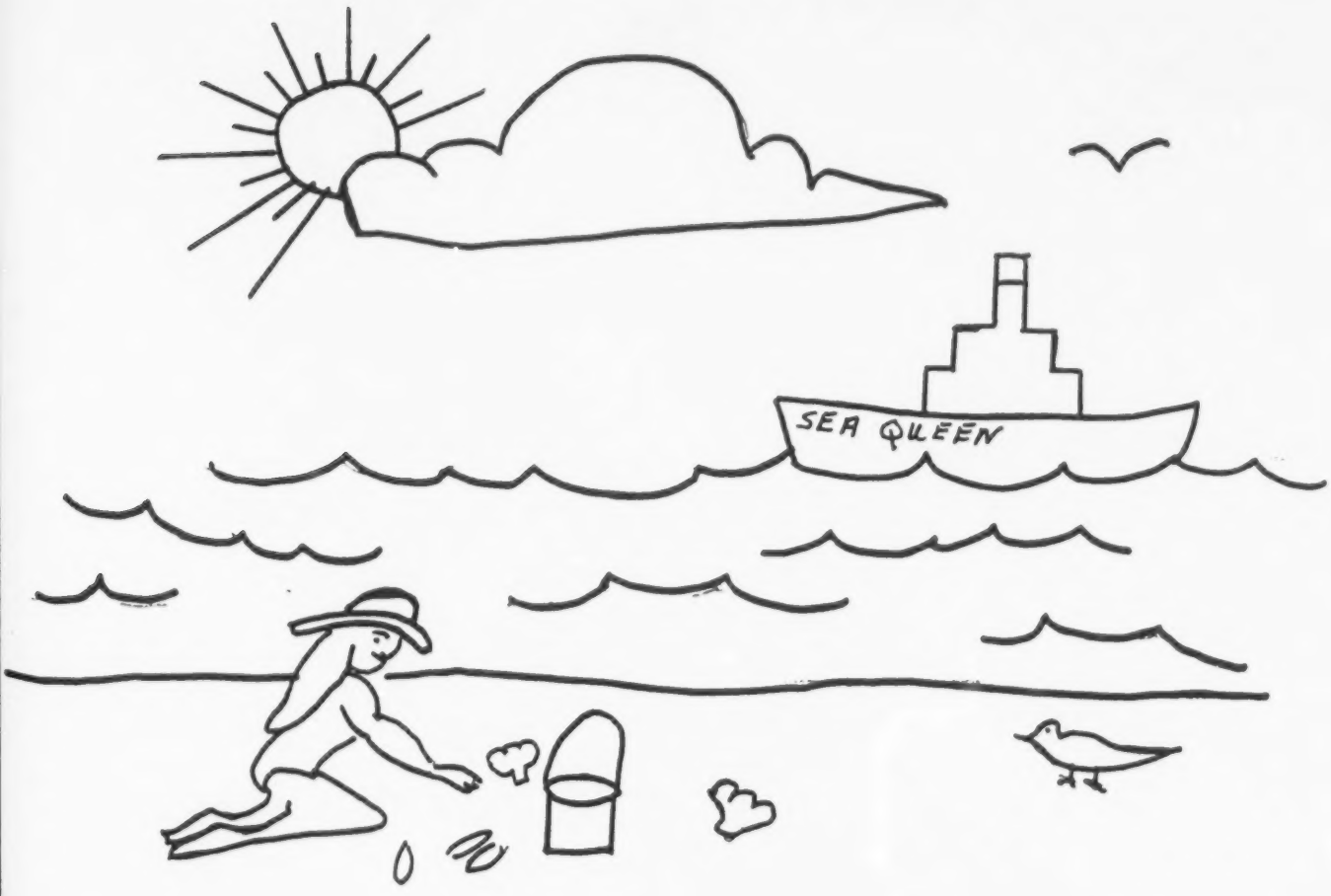
Because he was late on Friday morning, he couldn't pick up wrapping materials from a local supply store. This caused a 3-day delay in shipping procedures. It was easy to identify the problem.

LATE FOR WORK ON FRIDAYS.

6.

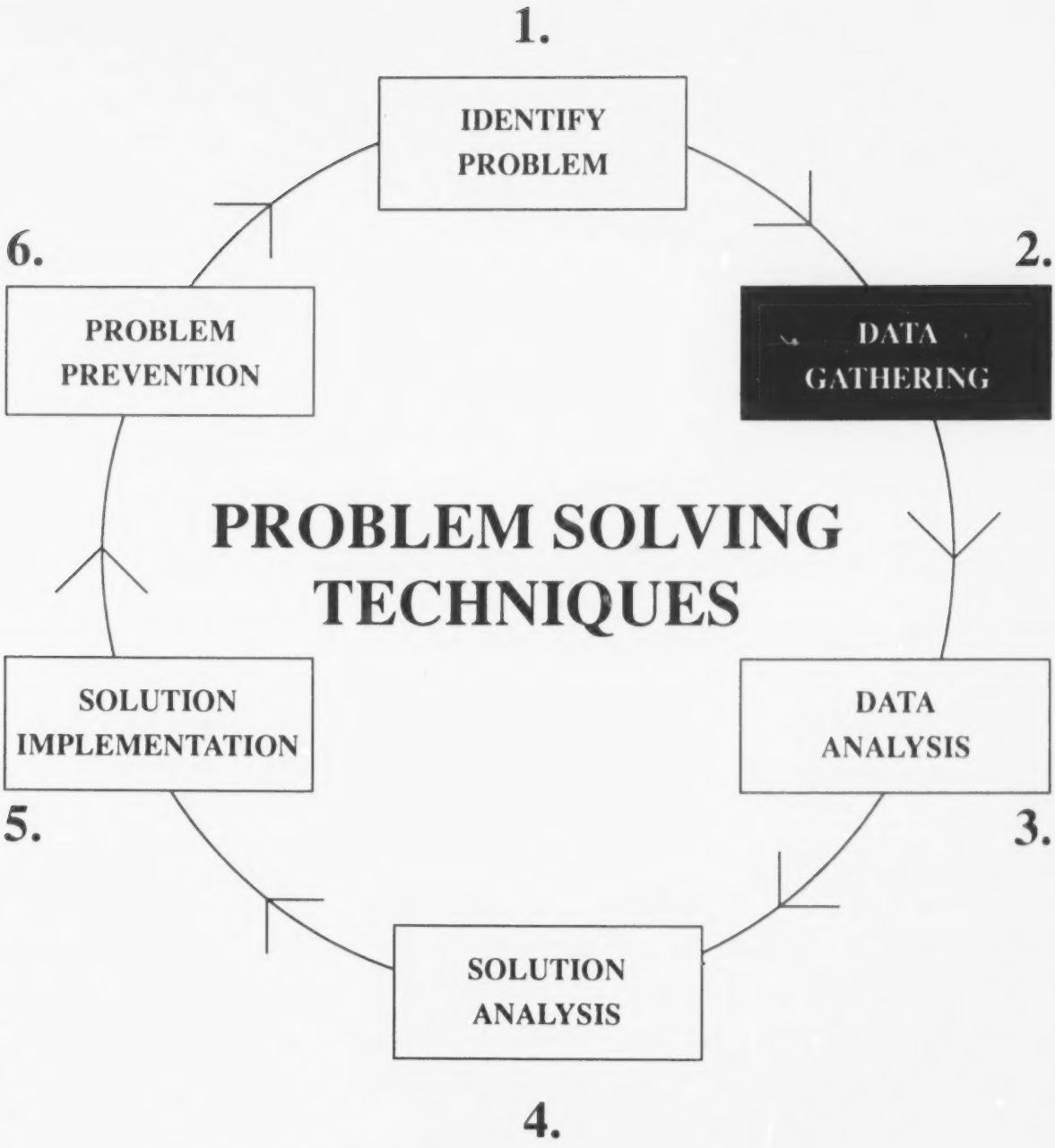
PROBLEM	-	A DOUBT, UNCERTAINTY, DIFFICULTY, OR CONFLICT REQUIRING A SOLUTION
PROBLEM SOLVING	-	ACT OF DECIDING THE BEST SOLUTION OUT OF MANY POSSIBLE ANSWERS
BRAINSTORMING	-	GENERATING IDEAS SPONTANEOUSLY WITHOUT JUDGMENT OR CRITICISM
SOLUTION	-	AN ANSWER OR EXPLANATION TO THE PROBLEM
DECISION	-	MAKING UP ONE'S MIND

YOUNG WOMAN AT THE BEACH



CINDY COLLINS SPENT A CONSIDERABLE AMOUNT OF HER TIME AT THE SEA COLLECTING AND COUNTING SEASHELLS TO SEE HOW MANY SPECIES SHE COULD FIND OF DIFFERENCES.

NUMBER OBSERVED_____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STEP 2 - DATA GATHERING

The problem solver needs to know as much as possible about a problem in order to arrive at a solution. Therefore, the second step in the problem solving procedure is to gather information. This procedure is called the data gathering phase.

The more information or facts gathered about the problem, the easier it is to arrive at a good solution. In order to do this, the problem solver must find out as much as possible about the problem. This step is also called the research phase. Research is looking into a subject for the purpose of discovering and checking the facts.

Time is an important factor in doing your research. If a decision has to be made immediately, do the best you can with the information available to you at the moment. Trust your ability and common sense. Accept the consequences of that decision. There are no perfect decision makers. If you make a mistake, learn from it.

If there is no immediate need to solve the problem, use your time wisely for research. Do your homework. Learn what you don't know. Give yourself enough time to understand and feel satisfied with the data you assemble.

How much information should be gathered? A sensible rule to follow is to gather all the information needed to see the whole picture.

Problems range from the simple to the more complex. You can solve most problems by drawing from your own experiences, intuition, and knowledge. For example, if you are consistently late for work, only you know the facts needed to get at the root of the problem.

For more complex problems, you may need to seek assistance from others. There are many valuable resources available. Resources include experts with knowledge and experience in the field. For example, if a problem is health related, a doctor is considered a resource person. Other resources are books, tapes, maps, videos, and written records. Libraries, schools, and businesses are places where information is stored. Learning from others shows courage and strength of character. An educated person is not one who knows everything but someone who knows the resources to consult to get the information.

Below are three helpful suggestions to keep in mind during the second step.

1. Be open to anything and everything that comes to mind. The answer or solution may be something different or unexpected. This is called brainstorming which is a sudden impulse or idea. Brainstorming can be used by an individual or with a group.
2. When sufficient information is obtained, organize and write down the facts on a flow chart, graph, diagram, or any other form that allows you to look a the total picture in one glance.
3. In looking at the total glance, you can easily become overwhelmed by the amount of information so that the problem seems insolvable. To avoid becoming overwhelmed, remember that a problem can be broken down into

smaller steps and taken one at a time. A problem solver must learn to skillfully use the information step by step.

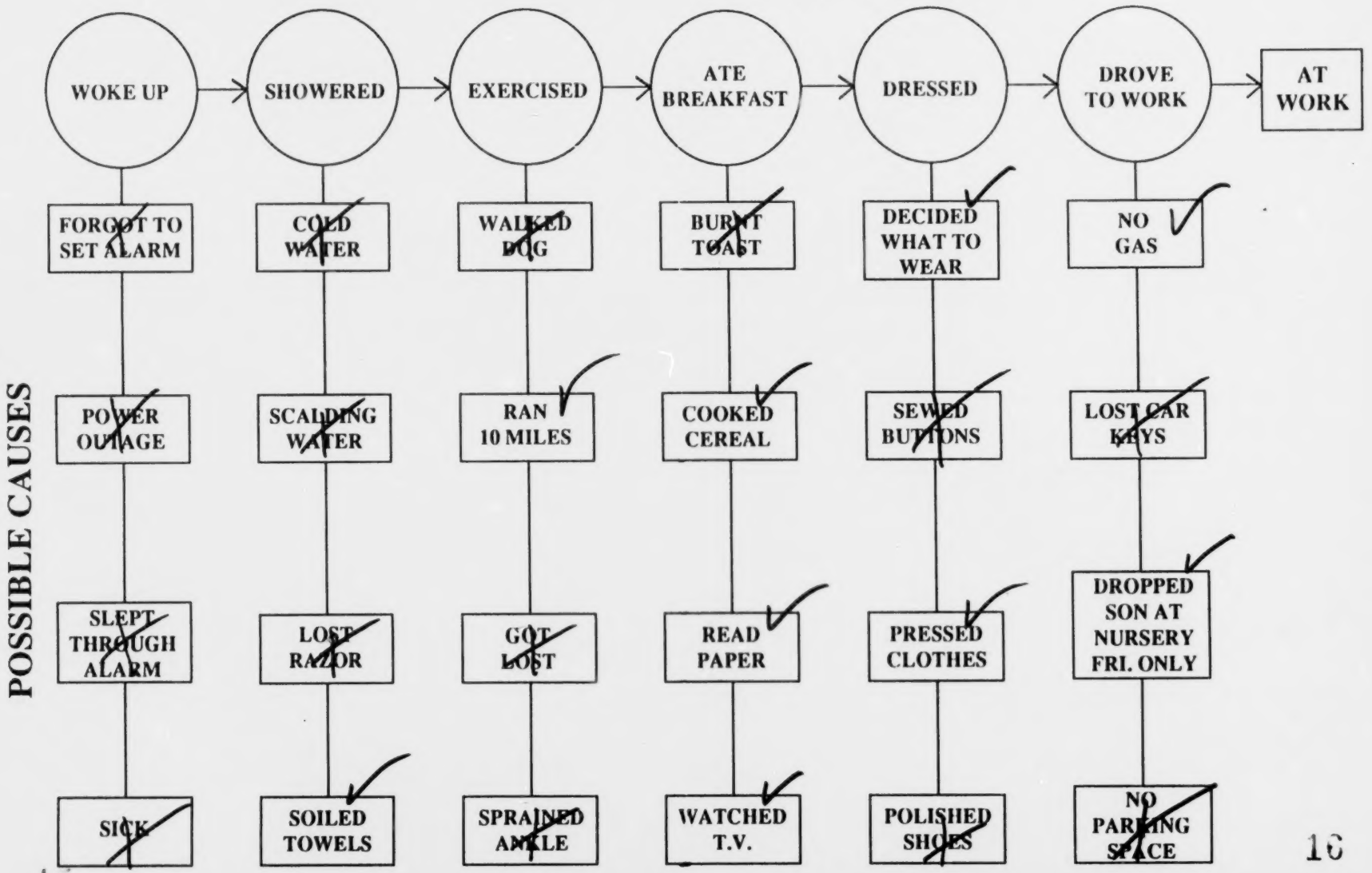
3. A trap many people fall into at this point in the process is to try to solve or analyze the problem. The data gathering step is not the time to analyze materials. The main purpose of step two in the problem solving process is:

GATHER DATA.

DON'T ATTEMPT TO SOLVE OR ANALYZE DATA AT THIS POINT.

The following page shows how John brainstormed and organized the facts gathered about his tardiness problem.

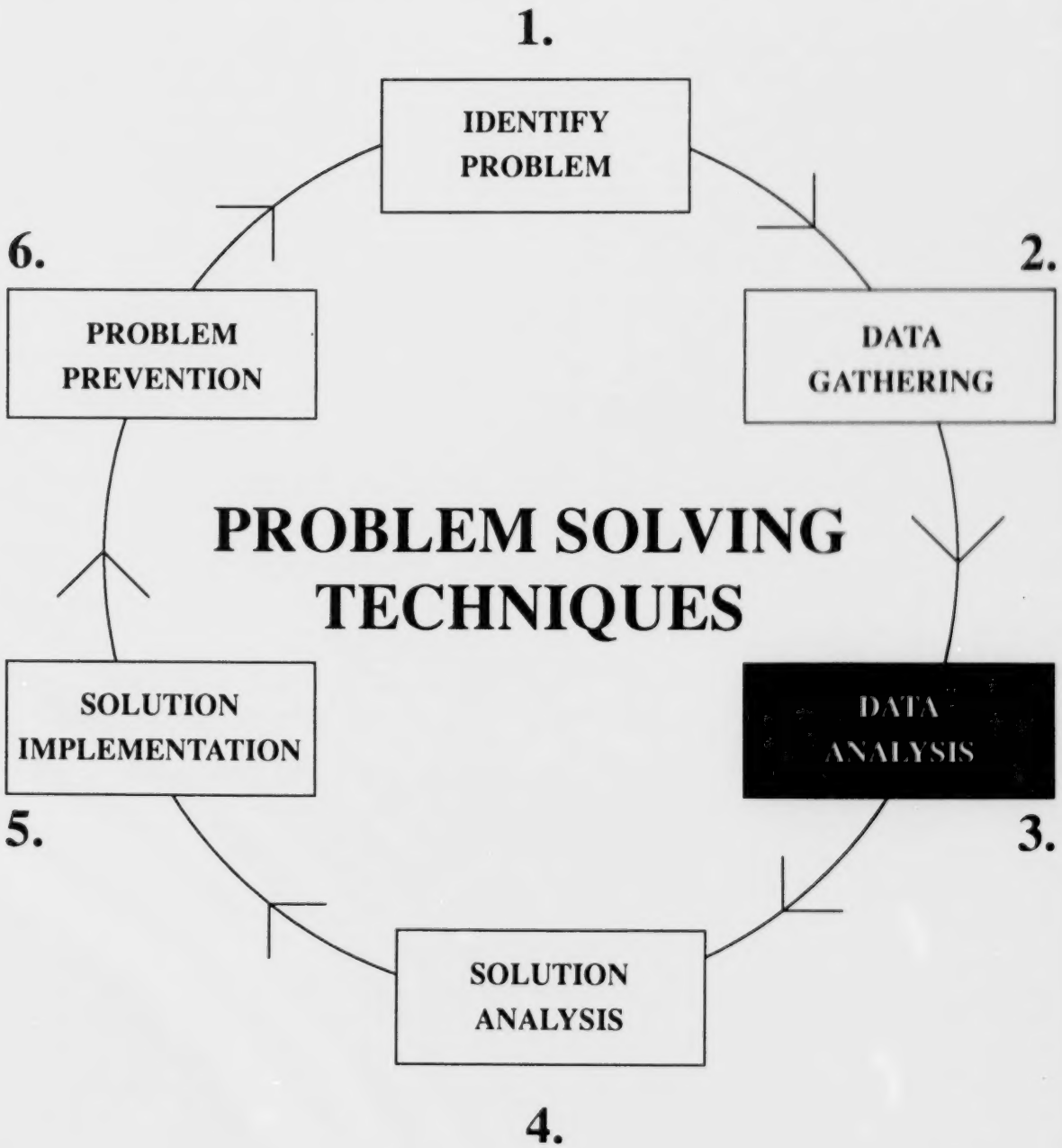
LATE FOR WORK EVERY FRIDAY
DATA GATHERING FLOW CHART



POSSIBLE CAUSES

13.

RESEARCH	-	LOOKING INTO A SUBJECT IN ORDER TO DISCOVER OR CHECK FACTS
EXPERT	-	A PERSON POSSESSING SPECIAL SKILLS OR KNOWLEDGE IN A CERTAIN FIELD
RESOURCES	-	A SOURCE THAT PROVIDES INFORMATION OR DATA
PROCESS	-	A SERIES OF ACTIONS DIRECTED TO SOME END
BRAINSTORM	-	SUDDEN IMPULSE OR IDEA
ANALYZE	-	EXAMINE
SOLVE	-	FIND AN ANSWER OR EXPLANATION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STEP 3 - DATA ANALYSIS

Data analysis is the third step in the problem solving process where you look at the gathered data and compare it to what is normal or expected. The problem solver examines the information in order to determine possible solutions.

This step is called the cause and effect stage. The cause of the problem is the reason why something happens. The cause produces an effect. The effect is the end result. An effect cannot happen without a cause.

THE CAUSE = THE EFFECT

The problem identified in step 1 showed that John was late for work every Friday morning. Tardiness is the result or effect of his action. To find out why John was tardy, you have to look for the cause of the problem. To determine possible causes, analyze the actions outlined in the data gathering flow chart.

Analyze each box on the flow chart and ask which activity could be the cause of tardiness. Cross out and eliminate the boxes of activities that are obviously not a cause. For example, a power outage is a reason for tardiness but it is not likely to happen every Friday morning. If he slept through the alarm on Friday, why not other days of the week?

Check the boxes that might be a possible cause. For example, John noted that Friday was the only day he dropped his son at nursery school. John exercised by running 10 miles a day. Perhaps 10 miles takes too much time. He might have to consider 5. John could read half the paper on Friday morning and the other half on

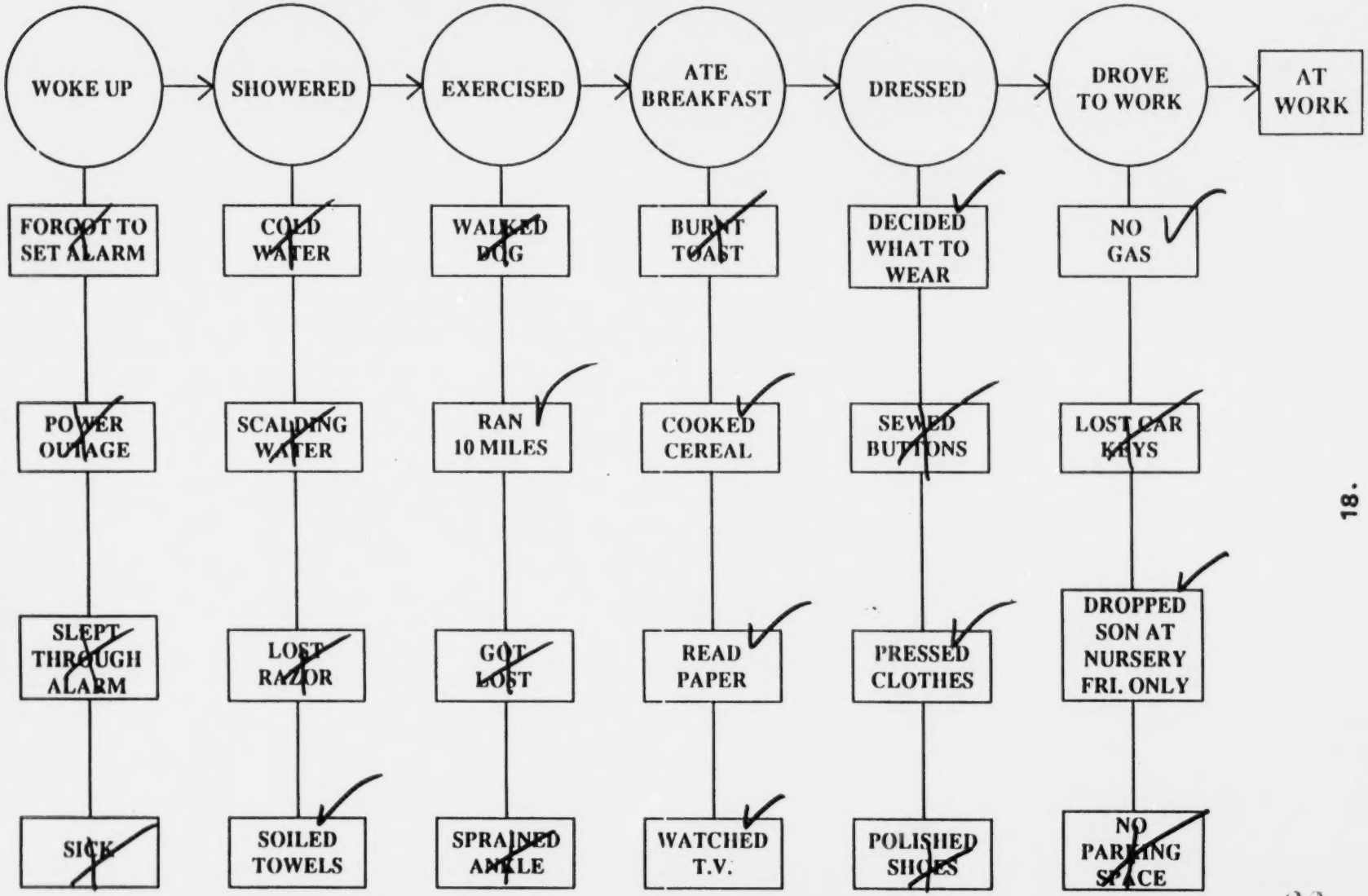
Friday night. Notice that there can be many causes and each person's analysis is different.

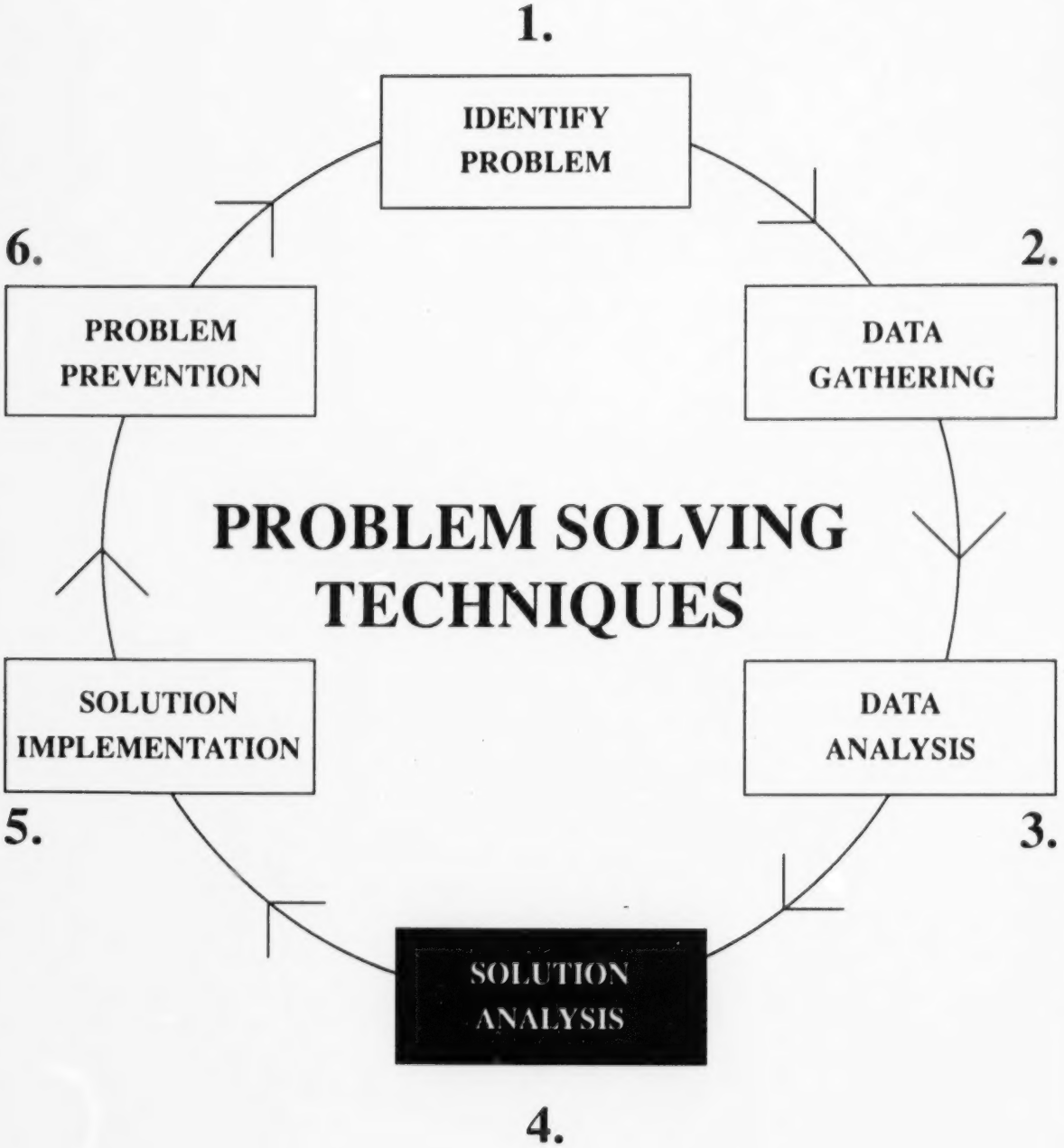
Make a list of the activities that might cause a problem and analyze them for possible solutions.

CAUSE	POSSIBLE SOLUTION
. soiled towels	. wash twice a week
. ran 10 miles	. run 5 miles . run in the evening
. cooked cereal	. eat cold cereal instead
. read the paper	. read half of the paper . read the other half after work
. watched TV	. eliminate . cut down time watching TV
. decided what to wear	. decide the night before
. pressed clothes	. press them the night before . send shirts to the laundry . buy clothes that don't need pressing
. no gas	. fill up the tank three times a week
. dropped son at nursery	. ask grandfather to drop son

The next page shows how John analyzed possible causes. Once this task is completed, you are ready for the next step in the problem solving process which is to select the BEST solution out of the many possible causes.

LATE FOR WORK EVERY FRIDAY
DATA GATHERING FLOW CHART

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STEP 4 - SOLUTION EVALUATION

An important step takes place in the fourth part of the process because you decide what to do about the problem. At this point, you look at all the possible causes and choose the BEST solution. Your analytical skills, intuition, logic, feelings, experiences, values, and opinions all come into play as you weigh each possible solution and see how it compares with the others. Making a decision is a rather simple step but making the BEST one requires some thought.

To arrive at the BEST decision, ask yourself some basic questions about each solution.

What would happen if...?

What are the cold hard facts about this decision?

Is one solution more effective than another?

What is the time factor involved in this solution?

Does the action address the problem or is it only a bandage?

Does this solution create more problems than it solves?

If the solution involves money, can I afford it?

Be realistic about each solution to the problem. Make sure it can be carried out. For example, asking the grandfather to drop John's son at nursery school is an excellent solution, providing the grandfather can accomplish the task. John is putting an older son through college so buying clothes that don't need pressing is not an option.

Out of all the solutions, choose the one that seems the most reasonable to implement. John's problem is one of timing so the solution must also be time effective. Be creative in brainstorming all possibilities. In the process of evaluating possible solutions, new ideas may surface. The solution might be a combination of two solutions joined into one.

John evaluated each solution to determine which was the best to implement.

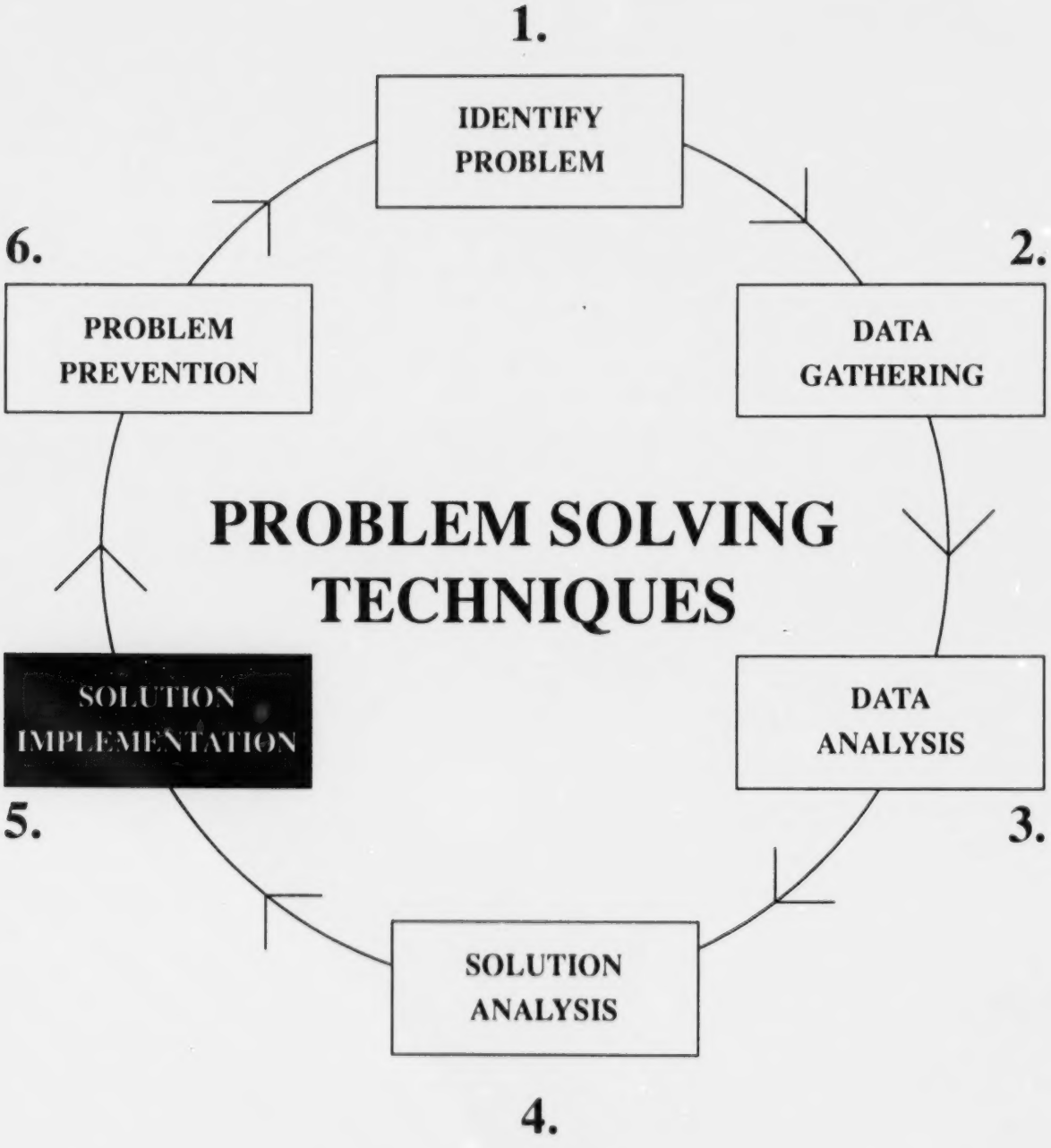
SOLUTION	EVALUATION
. wake up a half hour earlier	. gets up too early already, needs sleep
. buy a new alarm clock	. might sleep through alarm again
. ask grandfather to bring son to nursery	. dropping his son at grandfather's saves no time . has good conversations with his son during this time and the relationship is a priority
. eliminate reading paper and watching television	. have time on Friday night to read paper, . television isn't necessary or important
. jog in the evening	. too dangerous when dark
. ask a fellow employee to pick up shipping and wrapping materials	. wouldn't solve the problem . places responsibility on someone else

- ask supervisor to add extra shipping days on customer contracts
- would add more tension to the relationship
- might get fired
- get clothes ready the night before
- wouldn't save enough time

John realized his problem was basically a matter of time. He had to pick up about an hour on Friday in order to get to work on time. According to his reasoning, he could gain an hour by reading the paper on Friday night instead of Friday morning and eliminate television altogether. Consequently, this seems like the BEST solution to his problem with the facts he has at this point.

Once the solution is determined, it is ready to be implemented. This is what happens in step 5.

CAUSE	-	SOMETHING THAT PRODUCES A RESULT
EFFECT	-	RESULT, OUTCOME, ACCOMPLISHMENT, CONSEQUENCES OF A CAUSE
POSSIBLE	-	CAPABLE OF BEING TRUE
SOLUTION	-	AN ANSWER OR EXPLANATION
EVALUATION	-	JUDGE VALUE OR WORTH OF SOMETHING, DETERMINE THE WORTH OF AN ANSWER
PROBABLE	-	LIKELY TO BE TRUE
IMPLEMENTATION	-	PUT INTO ACTION
PRIORITY	-	COMING FIRST IN IMPORTANCE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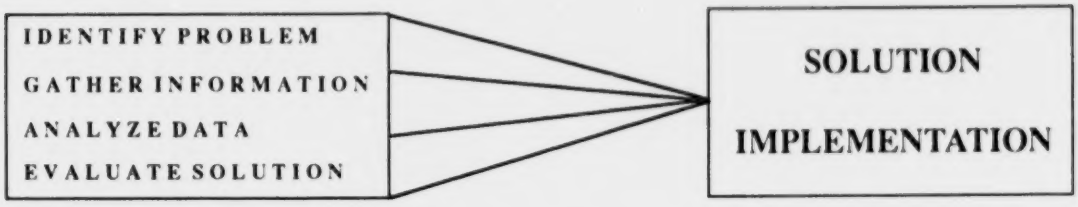
STEP 5 - SOLUTION IMPLEMENTATION

Making a decision is one thing, putting it into practice quite another. A decision is worthless until it is put into action. Once a decision is made, it must be implemented. The preliminary steps from one to four all merge together at the implementation stage.

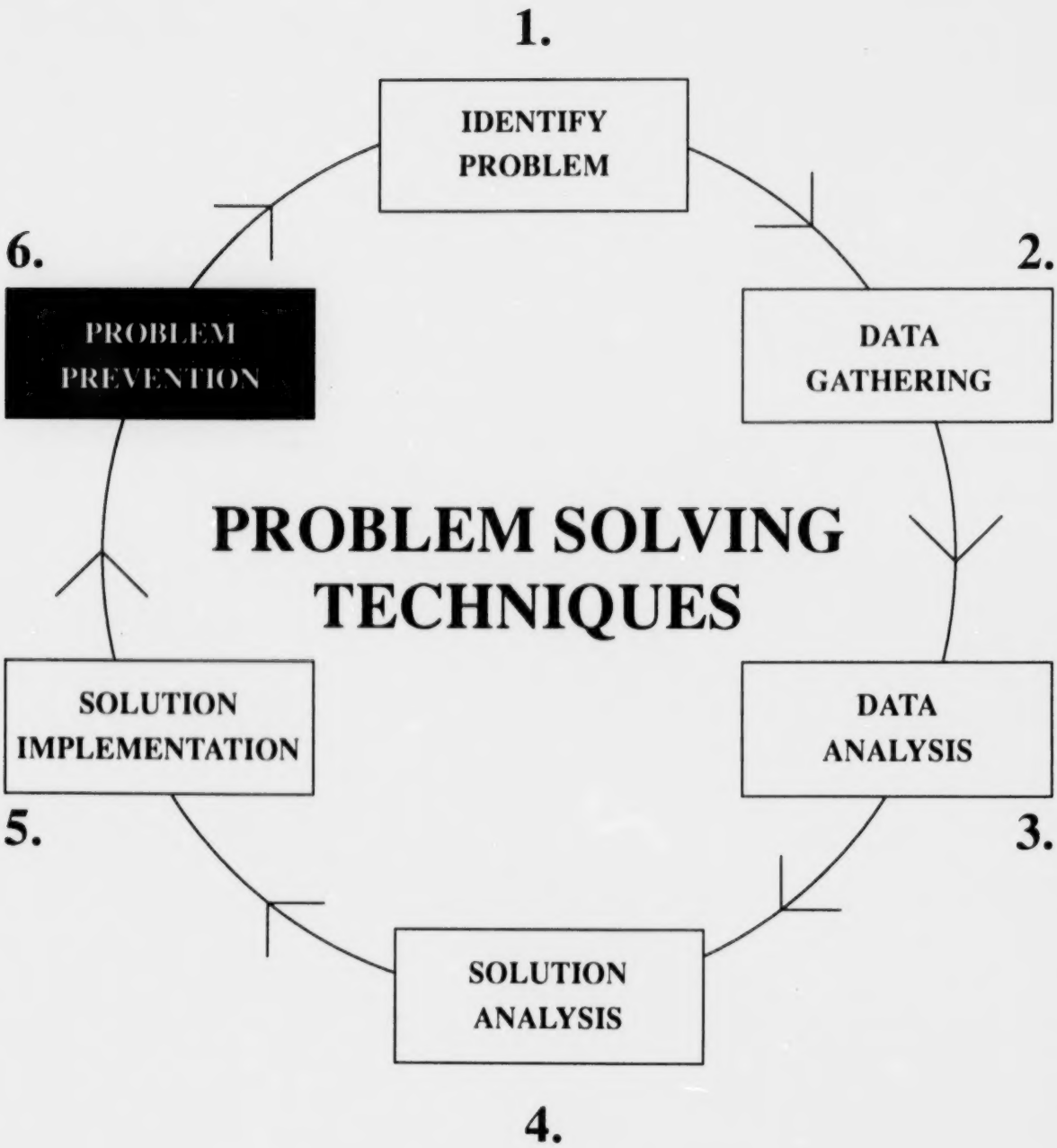


Implementation is putting your decision to work. This is the stage where change, corrections, or improvements are made. Change may be in materials, manners or behavior, people, time, or the very process itself.

During this stage, notify people involved in the implementation process. Explain any changes and how they affect them and you. John's family and working community are both affected by his solution. The best way to secure success is to include others in the implementation process. people are more apt to co-operate if they have input and can understand what is happening.

It is natural to think the total process ends here. There is yet another step to make sure the implementation is working and that the problem doesn't happen again.

DECISION	-	ACT OF MAKING UP ONE'S MIND
MERGE	-	COMBINE, UNITE INTO ONE
PRACTICE	-	REPEAT, EXERCISE IN ORDER TO GAIN SKILL
CHANGE	-	MAKE A DIFFERENCE
PRELIMINARY	-	LEADING UP TO, INTRODUCTORY OR PREPARATORY STEPS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STEP 6 - PROBLEM PREVENTION

How do you know the solution is working?

How do you know the problem is fixed or will stay fixed?

How do you know the problem won't happen again?

As you can see from these questions, another step is necessary to ensure that the solution takes care of the problem. Perhaps adjustments or further improvements need to be made.

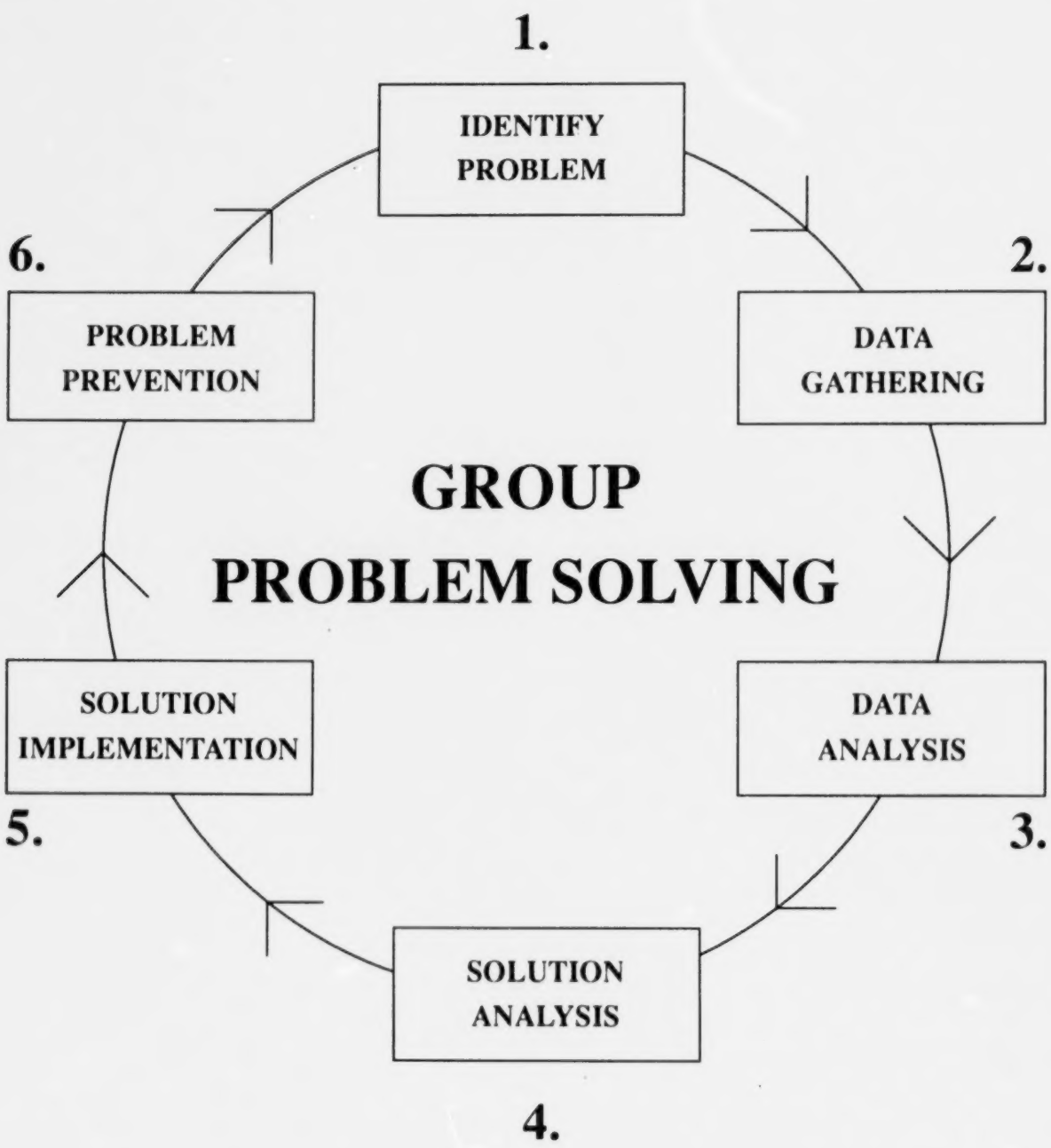
Continual review of the solution guarantees that the problem won't happen again. This is the reason why the final stage in the process is called problem prevention.

To make sure that John solves his problem, he must audit his Friday morning activities. In addition, he will also receive further comments from his supervisor.

If the problem isn't fixed or solved then the whole process from steps one through six have to be repeated.

Learning to make good decision is an art. The more you practice, the better you become at it. An important advantage in making your own decisions is that it enables you to author your own life. No one should make decisions for you. Taking the responsibility give you charge of the direction you want your life to take.

FEEDBACK	-	**REACTION, RESPONSE**
ADJUSTMENT	-	**PUT IN WORKING ORDER**
PREVENTION	-	**KEEP FROM HAPPENING**
AUDIT	-	**FORMAL EXAMINATION**
GUARANTEE	-	**PROMISE OR AFFIRM**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GROUP PROBLEM SOLVING

GROUP PROBLEM SOLVING

There is a lot of wisdom in the popular English adage, "Two heads are better than one." If this is true, the more heads involved in problem solving, the greater the numbers of ideas generated. There are advantages and disadvantages to group decision making.

ADVANTAGES

Each member receives the wealth of knowledge and experience from others in the group. Members can creatively build on one another's ideas and expertise. John had many creative ideas on how to solve his tardiness problem. In a group of five people, there are five times the amount of creative option, possibilities, and solutions. Other group members could come up with ideas that John wouldn't even think existed.

Solving problems by yourself can be lonely. Group effort provides support, comfort, and a sense that you're not alone in the situation. Sometimes you can accomplish far more in a group than you can accomplish as an individual. Cooperation builds team work.

Group members motivate and stimulate one other, calling each person to greater action. Members work more diligently when they are responsible to a group rather than to themselves.

DISADVANTAGES

On the other hand, there is the temptation that one member will rely on other members to do all the work. To offset this behavior, each person becomes responsible for a definite and equal part of the whole task.

Some people feel pressured in a group, thinking their ideas are controversial or that other members have better ideas than they do. Many are timid and afraid to speak out in a group. There is no better way to silence someone than to criticize or laugh at an idea given in good faith. There must be ground rules established at the onset of the group's function. No idea is worthless and all ideas are respected.

Another disadvantage about a group is that members might socialize and never get work done. Also, talkative members may tend to dominate the discussion. Each member must have a chance to speak. The most quiet member may possess the solution to the problem. Someone in the group needs to be responsible for keeping everyone involved and on the issues.

It is important to remember that the same rules for problem solving used by the individual also applies to the group.

GROUP EXERCISE PROBLEM SOLVING

1. The group will solve John's tardiness problem. Notice if the causes for the problem and solution are different than those described in this booklet.

2. Your instructor has a Jungle Survival Situation and other problem-solving exercises to complete.

BRAINSTORMING

BRAINSTORMING

An easy and enjoyable technique used in groups to creatively develop ideas is brainstorming. This technique helps group members explore as many ideas as possible in a short amount of time. The goal of a successful brainstorming session is to draw on the creativity of each group participant without judgment or criticism.

There are some basic rules and procedures for conducting a brainstorming session. They include the following.

BRAINSTORMING RULES

1. Encourage each member of the group to participate freely and not hold back any ideas.
2. There is no discussion of ideas at this point, that comes later.
3. No judgments are made either POSITIVELY or NEGATIVELY.
4. Piggy-backing on each others ideas is encouraged. Repetition of ideas is acceptable.
5. Be comfortable with moments of silence. It fosters new ideas.
6. Adopt the attitude that no idea is outrageous or impractical. A crazy idea may end up being the right one. Strive for quality ideas.
7. Think as though money or expense is no object.

BRAINSTORMING PROCEDURES

1. Identify the topic as clearly as possible by asking who, what, where, when, why, and how questions.
2. Give members of the group a few minutes to think about the topic.
3. Invite each member to share ideas either formally (in rotation with the option to pass) or informally by calling out ideas.
4. Ideas should be recorded and numbered on a chart or list so they can be referred to at a later time. Methods for recording and organizing data are given at the end of this chapter.
5. Conclude brainstorming when all ideas are exhausted.

Once ideas are generated, narrow the list down to a few good items. Similar ideas are combined if the group agrees they are the same. Discuss remaining ideas thoroughly until the group reaches a decision. Discussion is the most time consuming part of working in a group. To break any deadlock, use the voting or consensus process.

Voting is a formal choice expressed by a show of hands or secretly by casting a ballot. The solution getting the most number of votes wins. Those with the fewest are eliminated. To reach consensus requires a general agreement from all members. Some may not be entirely satisfied with the group's choice but they agree to go along with it. Once the group has agreed on the BEST solution, proceed to the implementation stage. The six steps used by individuals in solving problems are also used within groups.

ATTITUDE	-	MANNER OR FEELING TOWARD A PERSON OR THING
CONSENSUS	-	PROPOSAL GENERALLY ACCEPTABLE BY ALL MEMBERS OF THE GROUP
POSITIVE	-	CONFIDENT, ADMITTING THERE IS NO QUESTION
NEGATIVE	-	EXPRESSING DENIAL
QUALITY	-	EXCELLENCE
TECHNIQUE	-	PROCEDURE OR METHOD
REPETITION	-	SAY AGAIN

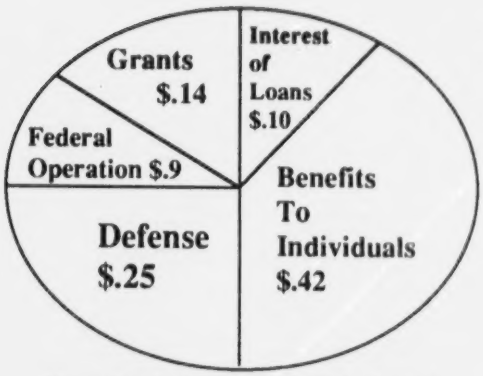
METHODS OF ORGANIZING AND RECORDING DATA

Lists, charts, and diagrams are a few examples on how to organize data generated in group discussions. For example, John used a flowchart (sometimes called flowsheet) to record ideas his ideas on tardiness. The next few pages discuss some of the models that can be used to organize information.

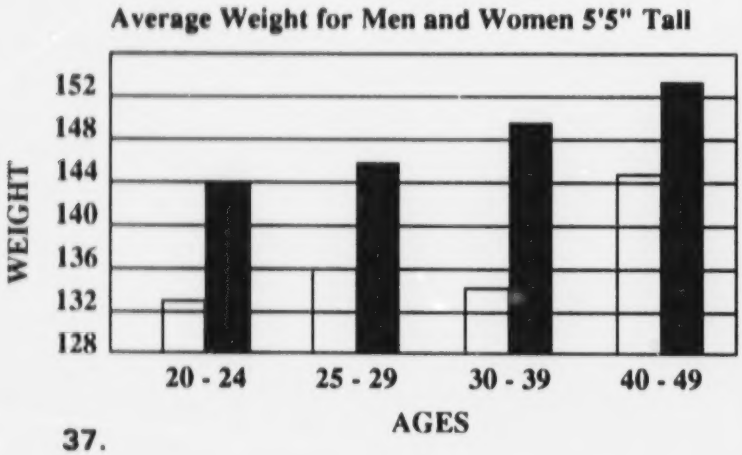
1. LISTS - A series of ideas set down one after another. For example, a food shopping list arranged by aisles in the store.

bananas
broccoli
cereal
flour
coffee
dog food
chicken
milk
chesse
eggs

2. GRAPHS - Diagrams showing relations among things by dots, lines, bars, or circles.

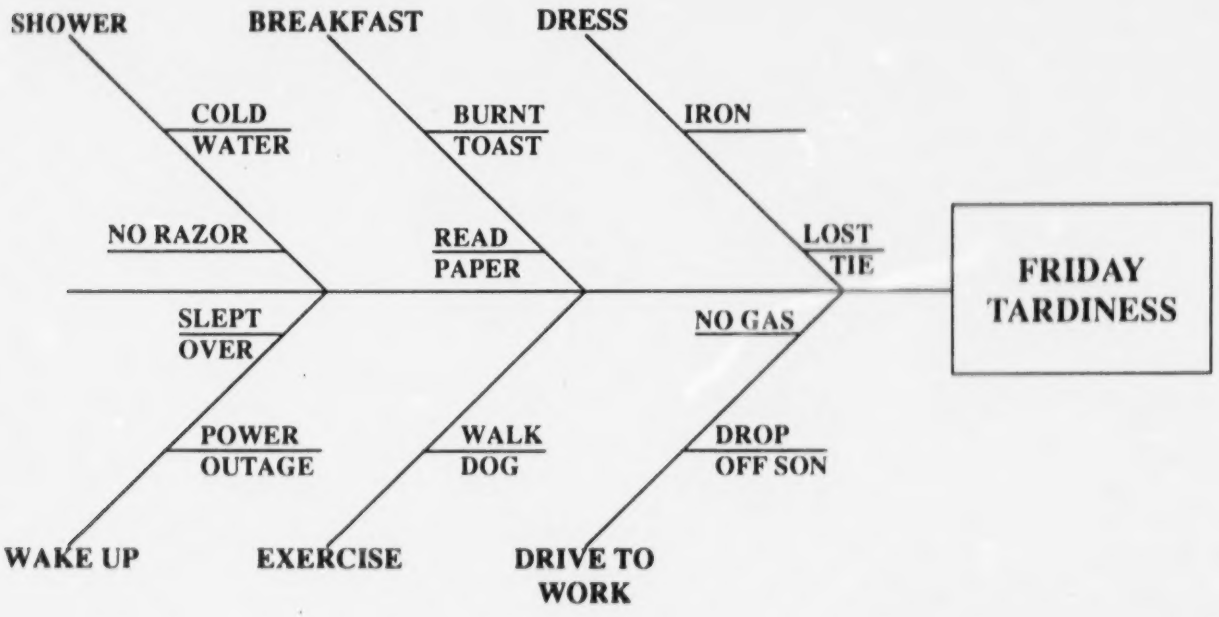


How the Federal Dollar is Spent

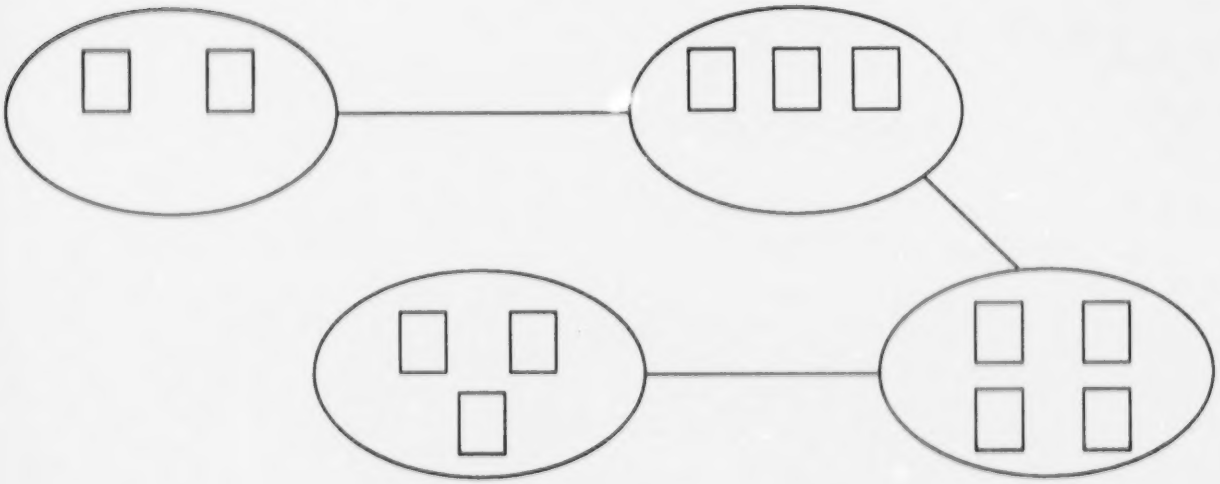


37.

3. **FISHBONE DIAGRAM** Also called cause and effect diagram.

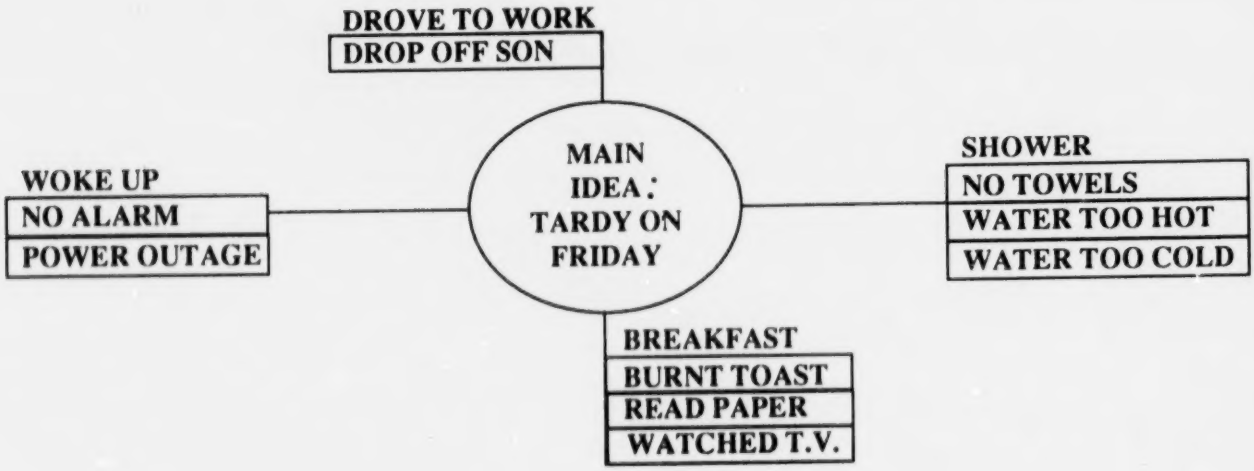


4. **STORYBOARDING** Place idea/s on card in center of board according to common themes.

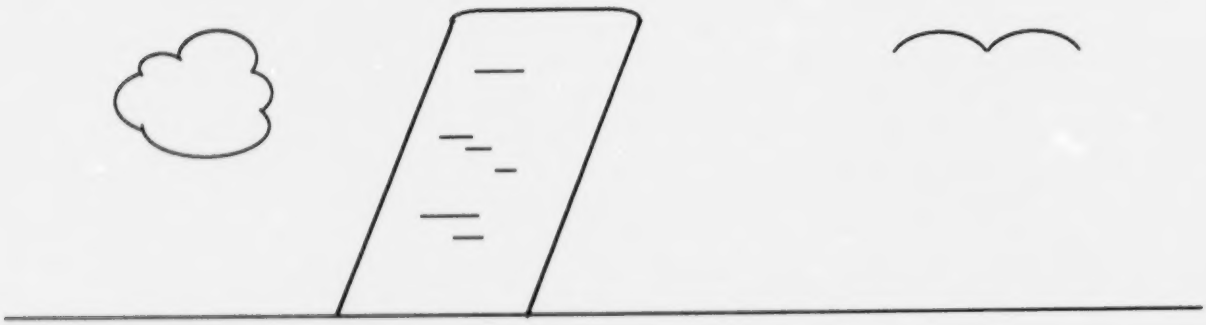


38.

5. MAIN MAPPING — Place main idea in center of a board and write ideas on the lines connected to the main theme.



1. In a group with 5-7 people, brainstorm ways to prevent he Leaning Tower of Pisa from falling.



2. There are five people afloat on a raft in the middle of the ocean. The five people are a mother, child, old man, doctor, and convict. A seaplane noticed their distress but can rescue only four people. As a group, decide which four will be saved.

3. Choose other situations/problems for the group to solve.